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Please find below and/or attached an Office communication concerning this application or proceeding.

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BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

Application Number: 10/593,463
Filing Date: September 19, 2006
Appellant(s): DAGUIER ET AL.

Stephen W. Kopchik
For Appellant

EXAMINER'S ANSWER

This is in response to the appeal brief filed February 28th, 2011 appealing from the Office action mailed July 23rd, 2010.

(1) Real Party in Interest

The examiner has no comment on the statement of the real party in interest.

(2) Related Appeals and Interferences

The examiner is not aware of any related appeals, interferences, or judicial proceedings which will directly affect or be directly affected by or have a bearing on the Board's decision in the pending appeal.

(3) Status of Claims

The following is a list of claims that are rejected and pending in the application:

Claims 1-4

(4) Status of Amendments After Final

The examiner has no comment on the Appellant's statement of the status of amendments after final rejection contained in the brief.

(5) Summary of Claimed Subject Matter

The examiner has no comment on the summary of claimed subject matter contained in the brief.

(6) Grounds of Rejection to be Reviewed on Appeal

The examiner has no comment on the Appellant's statement of the grounds of rejection to be reviewed on appeal. Every ground of rejection set forth in the Office action from which the appeal is taken (as modified by any advisory actions) is being maintained by the examiner except for the grounds of rejection (if any) listed under the subheading "WITHDRAWN REJECTIONS." New grounds of rejection (if any) are provided under the subheading "NEW GROUNDS OF REJECTION."

(7) Claims Appendix

The examiner has no comment on the copy of the appealed claims contained in the Appendix to the Appellant's brief.

(8) Evidence Relied Upon

The following is a listing of the evidence (e.g., patents, publications, Official Notice, and admitted prior art) relied upon in the rejection of claims under appeal:

WO 03/012156 A1 – Full English Translation	**BADARD**	**February 13th, 2003**

(9) Grounds of Rejection

The following grounds of rejection are applicable to the appealed claims:

Claim Rejections - 35 USC § 103

Claims 1-4 rejected under 35 U.S.C. 103(a) as being unpatentable over **Badard** (WO 03/012156 A1 – Full English Translation). The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

Badard:

Badard is drawn to a method for making a steel mechanical component of a composition as shown in the table below (Abstract and claims 1-5; p. 2, line 11 – p. 3, line 11).

Elements	Claim 1	Badard	Overlap
C	0.19 – 0.25	0.12 – 0.3	0.19 – 0.25
Mn	1.1 – 1.5	1 – 1.6	1.1 – 1.5
Si	0.8 – 1.2	0.8 – 1.5	0.8 – 1.2

S	0.01 – 0.09	0 – 0.1	0.01 – 0.09
P	trace – 0.025	0 – 0.03	trace – 0.025
Ni	trace – 0.25	0 – 0.6	trace – 0.25
Cr	1 – 1.4	0.4 – 1.6	1 - 1.4
Mo	0.10 – 0.25	0 – 0.3	0.10 – 0.25
Cu	trace – 0.3	0 – 0.3	trace – 0.3
Al	0.01 – 0.045	0 – 0.06 (0.008 – 0.05)	0.01 – 0.045
Nb	0.01 – 0.045	0 – 0.05 (0.02 – 0.05)	0.01 – 0.045
N	0.013 – 0.03	0.007 – 0.025	0.013 – 0.025
Bi	opt trace – 0.1	0 – 0.08	trace – 0.08
Pb	opt trace – 0.12	0 – 0.07	trace – 0.07
Te	opt trace – 0.015	0 – 0.02	trace – 0.015
Se	opt trace – 0.03	0 – 0.04	trace – 0.03
Ca	opt trace - 0.0050	0 – 0.05	trace – 0.0050
Fe	Balance	Balance	Balance
Carburizing – Carbo-nitriding	950 – 1050 ℃	950 – 1050 ℃	950 – 1050 ℃

Elements	**Claim 3**	**Badard**	**Overlap**
C	0.19 – 0.25	0.12 – 0.3	0.19 – 0.25
Mn	1.2 – 1.5	1 – 1.6	1.2 – 1.5
Si	0.85 – 1.2	0.8 – 1.5	0.85 – 1.2
S	0.01 – 0.09	0 – 0.1	0.01 – 0.09
P	trace – 0.025	0 – 0.03	trace – 0.025
Ni	0.08 – 0.25	0 – 0.6	0.08 – 0.25
Cr	1.1 – 1.4	0.4 – 1.6	1.1 - 1.4
Mo	0.10 – 0.25	0 – 0.3	0.10 – 0.25
Cu	0.06 – 0.3	0 – 0.3	0.06 – 0.3
Al	0.01 – 0.045	0 – 0.06 (0.008 – 0.05)	0.01 – 0.045
Nb	0.015 – 0.045	0 – 0.05 (0.02 – 0.05)	0.015 – 0.045
N	0.013 – 0.03	0.007 – 0.025	0.013 – 0.025
Bi	opt trace – 0.07	0 – 0.08	trace – 0.07
Pb	opt trace – 0.12	0 – 0.07	trace – 0.07
Te	opt trace – 0.010	0 – 0.02	trace – 0.010
Se	opt trace – 0.020	0 – 0.04	trace – 0.020
Ca	opt trace - 0.045	0 – 0.05	trace – 0.045
Fe	Balance	Balance	Balance
Carburizing –	950 – 1050 ℃	950 – 1050 ℃	950 – 1050 ℃

Carbo-nitriding			

Elements	**Claim 4**	**Badard**	**Overlap**
C	0.20 – 0.25	0.12 – 0.3	0.20 – 0.25
Mn	1.21 – 1.46	1 – 1.6	1.21 – 1.45
Si	0.85 – 1.10	0.8 – 1.5	0.85 – 1.10
S	0.01 – 0.08	0 – 0.1	0.01 – 0.08
P	trace – 0.020	0 – 0.03	trace – 0.020
Ni	0.08 – 0.20	0 – 0.6	0.08 – 0.20
Cr	1.10 – 1.40	0.4 – 1.6	1.10 – 1.40
Mo	0.11 – 0.25	0 – 0.3	0.11 – 0.25
Cu	0.08 – 0.3	0 – 0.3	0.08 – 0.3
Al	0.01 – 0.035	0 – 0.06 (0.008 – 0.05)	0.01 – 0.035
Nb	0.025 – 0.040	0 – 0.05 (0.02 – 0.05)	0.025 – 0.040
N	0.013 – 0.022	0.007 – 0.025	0.013 – 0.022
Bi	opt trace – 0.07	0 – 0.08	trace – 0.07
Pb	opt trace – 0.12	0 – 0.07	trace – 0.07
Te	opt trace – 0.010	0 – 0.02	trace – 0.010
Se	opt trace – 0.020	0 – 0.04	trace – 0.020
Ca	opt trace - 0.045	0 – 0.05	trace – 0.045
Fe	Balance	Balance	Balance
Carburizing – Carbo-nitriding	950 – 1050 °C	950 – 1050 °C	950 – 1050 °C

Al content is preferably from 0.008 – 0.05% so that the grains do not grow too large, in conjunction with preferred Nb and N contents (p. 6, para 3).

Adding Nb allows a more homogenous grain size to be obtained, which promotes homogeneity of plastic deformation in use and further minimizes this deformation (p. 6, lines 24-31).

A relatively high nitrogen content, from 70-250 ppm is recommended if carburizing or carbonitriding is carried out at elevated temperature (p. 7, lines 15-22).

Badard also describes a mechanical part obtained using this method, which is a pinion component.

Regarding claims 1-4, it would have been obvious to one of ordinary skill in steel metallurgy, at the time of the invention, to choose the instantly claimed ranges through process optimization, since it has been held that there the general conditions of a claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art. See In re Boesch, 205 USPQ 215 (CCPA 1980). MPEP 2144.05, para I states: "In the case where the claimed ranges "overlap or lie inside ranges disclosed by the prior art" a *prima facie* case of obviousness exists." Badard discloses a steel with overlapping ranges of C, Mn, Si, S, P, Ni, Cr, Mo, Cu, Al, Nb, N, Bi, Pb, Te, Se, Ca, and Fe along with a substantially identical processing method as explained above.

With respect to the Jominy test criteria specified in the claims, if the starting point is substantially identical composition which is subjected to substantially identically heat and thermomechanical treatments, then one of ordinary skill would reasonable expect identical structures and properties to be obtained and thus the average values of the five Jominy tests will thus necessarily be at the intervals claimed in claims 1 and 2. From MPEP 2112, V: "[T]he PTO can require an applicant to prove that the prior art products do not necessarily or inherently possess the characteristics of his [or her] claimed product. Whether the rejection is based on 'inherency' under 35 U.S.C. 102, on '*prima facie* obviousness' under 35 U.S.C. 103, jointly or alternatively, the burden of proof is the same...[footnote omitted]." The burden of proof is similar to that required

with respect to product-by-process claims. *In re Fitzgerald,* 619 F.2d 67, 70, 205 USPQ 594, 596 (CCPA 1980) (quoting *In re Best,* 562 F.2d 1252, 1255, 195 USPQ 430, 433-34 (CCPA 1977)).

(10) Response to Argument

Appellants assert (p. 5, para 2 to p. 8, final paragraph) that the instant specification sufficiently details and provides ample support for the criticality of the narrower claimed ranges of C, Mn, Si, Cr, Mo, and the combination of Al, Nb, and N relative to the cited Badard reference.

In response to the assertion of unexpected results and criticality of these alloying elements in the claimed steel, the Examiner notes that the burden is on Appellants to establish that results are unexpected and significant, as "[T]he evidence relied upon should establish "that the differences in results are in fact unexpected and unobvious and of both statistical and practical significance." *Ex parte Gelles*, 22 USPQ2d 1318, 1319 (Bd. Pat. App. & Inter. 1992), see MPEP 716.02(b).

Appellants have not met these requirements in the instant case as the paragraphs reproduced from the specification (*comparative testing is addressed separately as a different issue later*) by Appellants amount to allegations of unexpected results without comparative testing to determine if the properties differ to such an extent that the difference is really unexpected.

The probative value of these cited paragraphs in demonstrating nonobviousness of the claimed ranges is minimal in that, in themselves, these paragraphs do not

quantitatively and objectively establish what happens inside the claimed ranges as compared to outside the claimed ranges. Overall, to establish unexpected results over a claimed range, applicants should compare a sufficient number of tests both inside and outside the claimed range to show the criticality of the claimed range. *In re Hill*, 284 F.2d 955, 128 USPQ 197 (CCPA 1960).

In the present case, the carbon content paragraph cited (p. 5, para 4) does not state that the Jominy results only occur in the claimed range, but rather that this allows for the desired shape. The endpoints are stated to control hardness, not the Jominy shape.

With respect to the manganese content paragraph cited (p. 6, para 1), while the lower endpoint is disclosed as being selected to obtain the desired Jominy curve, the upper endpoint is selected for segregation, banding during anneal, and corrosion reasons, not hardness.

With respect to the silicon content paragraph cited (p. 6, para 3), the upper limit is selected for segregation and oxidation reasons, not Jominy curve shape.

With respect to the chromium content paragraph cited (p. 6, para 5) relating to the chromium content again relate to core hardness, not Jominy curve shape.

With respect to the molybdenum content paragraph cited (p. 7, para 2) there is no explanation to why the narrower range is selected beyond stating that this range is preferred to reach the desired Jominy curve shape.

With respect to the Al, Nb, and N content paragraphs cited (p. 7, para 4-5), the Al, Nb, and N contents mentioned do not claim that the claimed ranges are required to produce the unexpected result of a particular Jominy curve.

Appellants assert (p. 9, para 1 to p. 10, para 2) that a comparison of the inventive steels, E,F, and G in Table 1 and Figure 1 and the comparative steels A, B, C, and D provide a sufficient number of tests both inside and outside to claimed ranges to show the criticality of the claimed ranges. In particular, inventive steels E, F, and G as compared to comparative steels A, B, C, and D are: straighter and less steep (p. 9, para 2), "have no marked points of inflection", and the lack of marked points of inflection in unexpected and advantageous for producing greatly reduced deformations during quenching operation following a carburizing or a carbonitriding operation (p. 10, para 2).

In response, the Examiner asserts that the distinction between marked/significantly marked and non-marked inflection points in the Jominy curves of Figure 1 does not address the statistical and practical significance of differences between the inventive and comparative steels. While Appellants tie the lack of a significantly marked inflection point to minimal deformations during later quenching, there is no measurement of deflection between the inventive and comparative steels to see the extent that this deformation is at issue and determine the objective practical effect.

Moreover the question of whether an inflection points is marked, significantly marked, or not marked in the curves of Figure 1, is very much in the eye of the beholder

and thus introduces a degree of subjectivity that further diminishes the weight of such evidence.

Most importantly the Examiner asserts that the evidence produced has three major failings:

(1.) Whenever an alloying element of the comparative examples was outside the claimed range, particularly Cr and Mo, it was always lower.

The requirement to compare a sufficient number of tests both inside and outside the claimed ranges per MPEP 716.02(d), together with the requirement regarding evidence being commensurate in scope with the claimed range, implies that examples higher than claimed are also necessary to establish that the results only occur within the claimed ranges and not at values above the claimed ranges.

This requirement allows one to objectively determine that the claimed ranges (lower and upper endpoints) are indeed critical to achieve the unexpected results regarding Jominy curve shape.

(2.) Appellants' unexpected results are, at least in part, actually expected because one of ordinary skill in the art would understand from Badard that Cr and Mo are required to harden the steel (see Badard: p. 9, para 1 and 2) and one of ordinary skill in metallurgy would reasonably expect that more highly alloyed steels are generally harder.

While comparative example steels A, B, C, and D have Cr and/or Mo present at level lower than required by claim 1, lower levels of such alloying elements would thus be expected to result in lower hardness, and vice versa.

(3.) One of ordinary skill in the metallurgy would expect the prior art steel composition of Badard to have Jominy curve properties discussed because Badard discloses a substantially similar steel (all alloying element ranges are closely overlapped) and is hardened by the same process of carburizing or carbonitriding at 950 - 1100°C.

With respect to point 1, Appellants admit (p. 14, para 1 to p. 15, final para) that the specification does not disclose comparative steel samples having alloying elements present in amounts greater than claimed, but instead assert that this is not necessary to illustrate the unexpected results of the presently claimed invention as the instant specification provides motivation for choosing the upper limits of the claimed ranges, as this amounts to an indirect comparison to conventional steel compositions.

The probative value of the instant specification's discussion of upper limits of the alloying ranges in demonstrating nonobviousness of the claimed ranges is minimal in that, in themselves, this does not quantitatively and objectively establish what happens inside the claimed ranges as compared to outside the claimed ranges. Overall, to establish unexpected results over a claimed range, applicants should compare a sufficient number of tests both inside and outside the claimed range to show the criticality of the claimed range. *In re Hill*, 284 F.2d 955, 128 USPQ 197 (CCPA 1960).

Appellants also admit (p. 14, para 4 to p. 15, para 3) that the upper limits claimed "are not linked to the obtaining of a Jominy curve with a gentle slow and no significant marked inflection point, but that the choices for the upper limits of the alloying elements are based on classical metallurgical motivations."

How can Appellants claim that the claimed ranges are critical to achieve the desired Jominy curve shape when the upper endpoints are more or less arbitrarily chosen without regard to Jominy curve shape?

In other words, what distinguishes Appellants' claimed ranges from the closely overlapping ranges disclosed by Badard in view of the fact that normal desire of scientists or artisans to improve upon what is already generally known provides the motivation to determine where in a disclosed set of percentage ranges is the optimum combination of percentages (MPEP 2144.05)?

Appellants request (p. 10, para 3) that the declaration under 37 CFR 1.132 filed on February 12th, 2010 be thoroughly considered in assessing the patentability of the presently claimed invention.

In response, the Examiner has already addressed this affidavit in p. 6 to 8 of the non-final Office action mailed April 13th, 2010.

Appellants assert (p. 11, para 1 to p. 12, para 1) that the Examiner's asserted closest prior art example of Table 3 of Badard is not the closest prior art per MPEP 716.02(e) as Badard does not specify the ranges of Al, Nb, and N in Table 3.

In response, while Table 3 example of Badard is silent as to the Al, Nb, and N content, Badard implies in paragraph 2 of page 15 introducing Table 3, that the sample was produced in the form mentioned before, referring to the way the other test results (those of Table 1, samples 1-10) were produced. These samples were said to have an Al content less than 0.050% and a N content of 70 - 250 ppm (0.007 – 0.025 – see p.

11, para 1). Furthermore, claim 3 of Badard discloses Al, Nb, and N contents with further discussion at p. 9, para 4 regarding Al and further discussion at p. 10, para 3 regarding Nb.

It is not clear how Appellants comparative examples, which each have at least elements outside the claimed ranges can be considered closest prior art than the closest example of Badard which discloses alloying elements within the claimed ranges.

Appellants assert (p. 12, para 3 to p.13, para 5) that even if one were to considered Table 3 in view of claim 3 as the closest prior art, comparative steel D is similar enough to Badard (and has N within the range suggested by claim 3 of Badard) to suggest that the Jominy curve would be not rectilinear or at the very least would have a significantly marked inflection point and would result in excessive deformations of the steel during quenching (p. 12, para 4).

In response, the Examiner disagrees in that comparative example steel D can serve as indirect evidence of Badard as whereas steel D of Table 1 in the instant specification has a chromium content and nitrogen content less than that required by the instant claims, Table 3 of Badard disclosed 1.11 wt% Cr and Badard samples were a N content of 70 - 250 ppm (0.007 – 0.025 0 see p. 11, para 1).

(11) Related Proceedings Appendix

No decision rendered by a court or the Board is identified by the examiner in the Related Appeals and Interferences section of this examiner's answer.

For the above reasons, it is believed that the rejections should be sustained.

Respectfully submitted,

/Mark L. Shevin/

March 15th, 2011
AU 1733

10/593,463

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